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(54) Abstract Title

Updating of an EPG database using a second tuner

(57) A device for updating EPG information in a digital TV receiver having a first and a second tuner (100, 108). A desired viewing channel is selected by the first tuner (100). The device comprises first and second IF modules each converting IF signals output respectively from the first and second tuners (100, 108) depending upon the channel selections into respective basebands, first and second channel decoders (104, 112) each converting respective output signals from said first and second tuners (IF Modules (102, 110) to channel signals so as to reconstruct data bit stream, a first TS decoder (106) for separating respective audio data, video data, and auxiliary data from said data bit stream reconstructed by the first channel decoder (104), a second TS decoder (114) for separating auxiliary data from the data bit stream reconstructed by the second channel decoder (112), a memory (118) for storing EPG information, and a controller (116) for updating the memory (118) with the auxiliary data separated by the second TS decoder (114) from the data bit stream obtained through other channels selected by the second tuner (108). The other channels selected may be preset by the user or may be all of the received channels or may be the remaining, received channels, other than the one being viewed.

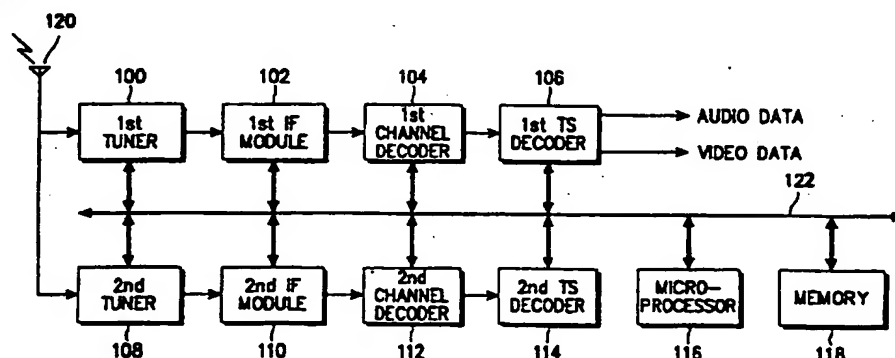


FIG. 1

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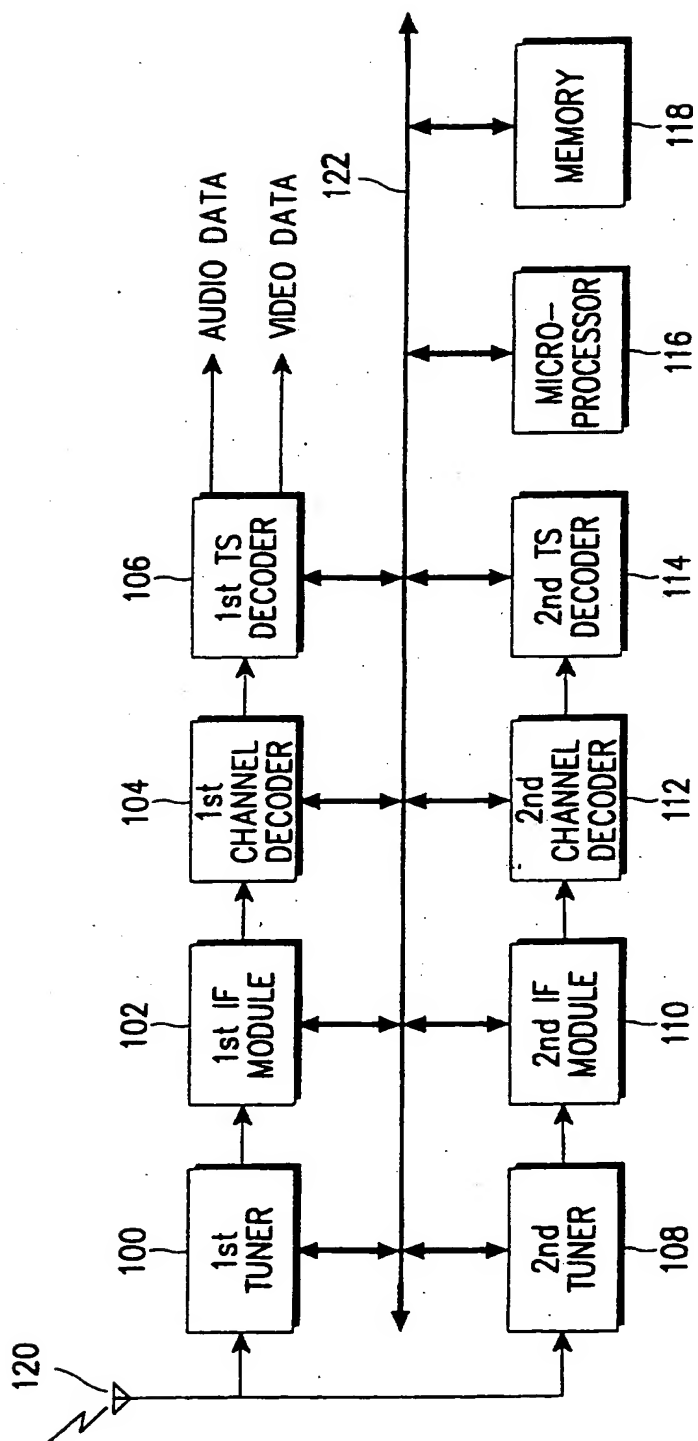


FIG. 1

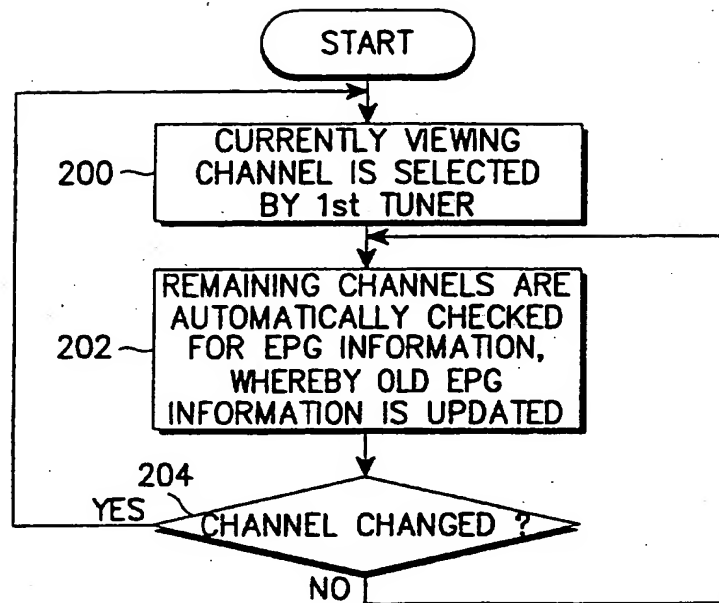


FIG. 2

METHOD FOR UPDATING ELECTRONIC PROGRAM GUIDE  
INFORMATION AND DEVICE THEREOF IN A DIGITAL TV  
RECEIVER

5       The present invention relates to a digital television (hereinafter referred to as "TV"), and more particularly to a method for updating the electronic program guide (EPG) information and a device thereof.

10       Digital broadcasting systems for the next generation such as HDTV (high-definition television) can versatily allocate the required bit rates when needed for desired services. Such versatility makes it possible to transmit multiple programs through a RF channel with a limited  
15       transmission bandwidth. For example, standard definition television (SDTV) programs can be planned on multichannels for a period of time, and HDTV programs on a single channel for another time period. This concept is so called ISDB (Integrated Services Digital Broadcasting) which is  
20       referred to as a basic concept of the digital broadcasting system at the international conference such as ITU-R (International Telecommunication Union-Radio Communication Sector).

25       Accordingly, it is necessary for digital multichannel TV broadcasting to display program guide information on TV screen so that users can select a desired one out of several available programs. In the U.S.A., a special EPG regulation is provided for the digital broadcasting such  
30       as HDTV. That is, a TV broadcast station transmits EPG information through each RF channel, whereby TV sets store the EPG information and display it on to the TV screen when user requests. An example of such an EPG regulation is the EPG standard of ATSC (United States Advanced  
35       Television System Committee) in U.S.A.

Such EPG information is received through viewing channel, i.e. current channel selected, whereby the preceding EPG information stored before is updated by new information when the former is different from the latter.

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It is very probable that although each TV broadcast station may transmit its own EPG, users may only tend to watch a limited number of specific channels. In such cases, the EPG information of channels other than the current channel can not be updated, and accordingly, although the EPG information of channels may have changed, the TV set may still have the old EPG information different from the new one. Consequently, users can be provided with erroneous EPG information concerning the other channels. Therefore, if a user wants to see EPG information on the other channels, he must interrupt the current TV channel to change to another channel for the EPG information concerned.

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As described above, although the EPG information on the current channel can be updated, the EPG information on other channels not viewed by user can not be updated, unless the current TV channel is interrupted and changed to another channel desired to see its EPG information.

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Accordingly, it is an aim of embodiments of the present invention to provide a method and device for immediately updating the EPG information about all the channels of the digital TV set so as to provide the latest correct EPG information.

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According to an aspect of the invention, there is provided a method for updating electronic program guide (EPG) information in a digital TV receiver having first and second tuners, the method comprising the steps of:

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selecting a channel to be viewed by use of the first tuner; and receiving and updating said EPG information for respective channels by checking channels by use of the second tuner.

5

Preferably, said channels to be checked are preset by a user.

10 The channels to be checked may be the remaining channels other than said viewed channel.

Said channels to be checked may comprise all the channels currently being received.

15

According to a second aspect of the invention, there is provided a device for updating electronic program guide (EPG) information in a digital TV receiver, comprising: first and second tuners for selecting channels; first and second IF modules for receiving IF signals output from said first and second tuners respectively and converting said IF signals depending upon the channel selections into respective basebands; first and second channel decoders for receiving the baseband signals output from said first and second IF modules respectively to thereby reconstruct data bit streams; a first TS decoder for separating respective audio data, video data and auxiliary data from the data bit stream reconstructed by said first channel decoder; a second TS decoder for separating auxiliary data from said data bit stream reconstructed by said second channel decoder; a memory for storing said EPG information; and a controller for checking the channels by use of said second tuner, confirming that EPG information is received from the auxiliary data of the respective channels and updating said EPG information to said memory.

35

The channels to be checked may preset by the user.

Said channels to be checked may be those channels other than a channel currently being viewed.

5

All the channels being received may be automatically checked by means of an automatic channel checking program of said controller.

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Said controller is preferably a microprocessor.

According to a third aspect of the present invention, a device is provided for updating EPG information in a digital TV receiver having a first and a second tuner while viewing through a channel selected by the first tuner, the device comparing first and second IF modules each converting IF signals output from the first and second tuners depending upon the channel selections into respective basebands, first and second channel decoders each converting baseband signals from said first and second IF modules to channel signals so as to reconstruct data bit streams representing channel data, a first TS decoder for separating respective audio data, video data, and EPG data from the data bit stream reconstructed by the first channel decoder, a second TS decoder for separating auxiliary data from the data bit stream reconstructed by the second channel decoder, a memory for storing EPG information, and a controller for updating the memory with the EPG data separated out by the second TS decoder from the data bit stream obtained through the other channels selected by the second tuner.

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For a better understanding of the invention, and to show how embodiments of the same may be carried into

effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings, in which:

Figure 1 is a block diagram of an EPG information updating device according to an embodiment of the present invention; and

Figure 2 is a process flow chart of the microprocessor shown in Figure 1 according to the embodiment of the present invention.

Figure 1 is a block diagram illustrating an EPG information updating device applied to an HDTV receiver adopting the MPEG standard. In the Figure, constituent elements not directly related to the present invention are omitted for the sake of clarity. Referring to Figure 1, when receiving digital TV broadcast signals through antenna 120, the first tuner 100 selects a first TV channel under the control of microprocessor 116, thereby generating the intermediate frequency (IF) signal. The first IF module 102 converts IF signals transmitted from the first tuner 100 into baseband signals. The first channel decoder 104 decodes the above baseband signals to channel signals so as to reconstruct a data bit stream corresponding to the first channel information.

The first transport stream (TS) decoder 106 separates audio data, video data, and auxiliary data from the data bit stream reconstructed by the first channel decoder 104, thereby separating audio and video data from the program selected by the microprocessor 116 among the programs received through the RF channel. Such separated audio and video data are decoded according to the MPEG standard by the corresponding audio or video decoders respectively, whereupon the resulting signals are processed to be output



in the form of audio and image signals. The auxiliary data containing the EPG information are delivered to the microprocessor 116.

5        When receiving digital TV broadcast signals through antenna 120, the second tuner 108 selects a TV channel under the control of the microprocessor 116, to thereby produce a corresponding intermediate frequency (IF) signal. The second IF module 110 converts IF signals  
10        output from the second tuner 108 into baseband signals. The second channel decoder 112 decodes the baseband signals to channel signals so as to reconstruct the data bit stream. The second TS decoder 114 separates auxiliary data from the data bit stream reconstructed by second  
15        channel decoder 112. Such separated auxiliary data also contain the above EPG information to be delivered to microprocessor 116.

20        The memory 118 consists of a ROM for storing programs of microprocessor 116, a RAM for temporarily storing data resulting from execution of programs of microprocessor 116, and an EEPROM for storing various reference data. The above EPG information is stored in memory 118 by microprocessor 116. The above microprocessor 116 serves as  
25        a controller of the HDTV receiver comprising the elements shown in Figure 1, thereby controlling the overall execution of the various functions of the HDTV receiver according to the program stored in memory 118.

30        The above first and second tuners 100, 108, first and second IF modules 102, 110, first and second channel decoders 104, 112, first and second TS decoders 106, 114, and memory 118 are connected with microprocessor 116 by means of bus 122.

Figure 2 is a process flow chart of the microprocessor 116 illustrating that the currently viewed channel is selected by first tuner 100, and second tuner 108 automatically searches all the channels, thereby identifying EPG information about each channel from auxiliary data separated by the second TS decoder 114, and updating the EPG information so as to store the updated EPG information in memory 118. The functions according to the process flow of Figure 2 are programmed into memory 118.

The operation according to the embodiment of the invention is described in detail with reference to Figs. 1 and 2 as follows. When the TV receiver is turned on, or the user changes the channel, the microprocessor 116 selects the current channel by means of the first tuner 100 in step 200. Thereupon, the first tuner 100 generates the IF signal of the current channel which is then converted into baseband so as to be further converted to channel signal by first channel decoder 104, whereby the resulting signal is applied to first TS decoder 106. Thereupon, the first TS decoder 106 produces the audio and video data of the current viewing channel so as to output audio and image signals, and at this time, the auxiliary data separated by the first TS decoder 106 are applied to microprocessor 116.

Under such state, the microprocessor 116 automatically checks, in step 202, other channels one by one sequentially by means of the second tuner 108, thereby receiving EPG information about each channel to update the old EPG information stored, and proceeds to step 204 to check whether the EPG information of current channel is to be changed. Apart from this, the operation of updating the EPG information on each channel is the same as in the

conventional method. That is, when checking each channel, the microprocessor 116 compares the current EPG information contained in the auxiliary data received from the second TS decoder 114 with the preceding EPG information stored in memory 118, and if they are  
5 different, updates the EPG information so as to store the newly received EPG information in memory 118.

For reference, the TV receivers included with HDTV  
10 sets are usually provided with such an automatic channel checking function that checks every channel currently received with respect to all the TV channels to store respective EPG information, in which such function is programmed in such manner that only the channels currently  
15 received are automatically checked. As described above, when the users have the channel-up or channel-down key pressed on without personally selecting channel by means of numeric keys, such channels not received can be prevented from being unnecessarily selected, so that the  
20 automatic channel checking function is used conveniently.

Accordingly in step 202, the TV channels currently received are checked for respective EPG information, and every EPG information checked is updated on the basis of  
25 the EPG information newly received.

Therefore, the EPG information about all the channels can be immediately updated and maintained up to date by means of the second tuner 108 independent of the currently  
30 viewing channel. Consequently, the inventive method can immediately provide the user always with the latest and correct EPG information regardless of the channel currently viewed and without requiring the user to change channels.

Although the present invention has been described with reference to specific embodiments, it will be noted that various modifications may be made without departing from the teachings of the present invention. Particularly, the above embodiment of the present invention shows an example only with respect to an HDTV receiver, but the present invention can be applied to all digital TV receivers employing an EPG information system. And although the above embodiment exemplifies the automatic channel checking method for updating EPG information, the present invention can also provide a method for checking only the remaining channels for the EPG information excepting the currently viewing channel, which has the advantage that the EPG information of the currently viewing channel can be transferred from first TS decoder 106 to microprocessor 116 without necessitating its separate checking by means of the second tuner 108. Also, it is possible that, when needed, only those channels desired by the user are checked for EPG information to be updated. Therefore, in no way should the above embodiment be construed as limiting of the invention itself. Therefore, the scope of the present invention must be determined by the appended claims covering all such changes and modifications which fall within the true scope of the present invention.

As described above, embodiments of the present invention have the advantage that the EPG information about all the channels of the digital TV receiver can be immediately updated and maintained up to date, and the user can be immediately provided with the latest and correct EPG information also about the channels currently not selected without requiring the user to change channels.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS

1. A method for updating electronic program guide (EPG) information in a digital TV receiver having first and second tuners, the method comprising the steps of:

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selecting a channel to be viewed by use of the first tuner; and

receiving and updating said EPG information for  
10 respective channels by checking channels by use of the second tuner.

2. The method for updating EPG information as defined in claim 1, wherein said channels to be checked are preset by  
15 a user.

3. The method for updating EPG information as defined in claim 1, wherein said channels to be checked are the remaining channels other than said viewed channel.  
20

4. The method for updating EPG information as defined in claim 1, wherein said channels to be checked are all the channels currently being received.

25 5. A device for updating electronic program guide (EPG) information in a digital TV receiver, comprising:

first and second tuners for selecting channels;

30 first and second IF modules for receiving IF signals output from said first and second tuners respectively and converting said IF signals depending upon the channel selections into respective basebands;

first and second channel decoders for receiving the baseband signals output from said first and second IF modules respectively to thereby reconstruct data bit streams;

5

a first TS decoder for separating respective audio data, video data and auxiliary data from the data bit stream reconstructed by said first channel decoder;

10

a second TS decoder for separating auxiliary data from said data bit stream reconstructed by said second channel decoder;

15

a memory for storing said EPG information; and

a controller for checking the channels by use of said second tuner, confirming that EPG information is received from the auxiliary data of the respective channels and updating said EPG information to said memory.

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6. The device for updating EPG information of the digital TV receiver as defined in claim 5, wherein said channels to be checked are preset by user.

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7. The device for updating EPG information of the digital TV receiver as defined in claim 5, wherein said channels to be checked are those channels other than a channel currently being viewed.

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8. The device for updating EPG information of the digital TV receiver as defined in claim 5, wherein all the channels being received are automatically checked by means of an automatic channel checking program of said controller.

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9. The device for updating EPG information of the digital TV receiver as defined in claim 5, 6, 7 or 8, wherein said controller is a microprocessor.

- 5 10. A method for updating electronic program guide (EPG) information in a digital receiver, the method being substantially as herein described with reference to the accompanying drawings.
- 10 11. A device for updating EPG information of a digital TV receiver, the device being substantially as herein described with reference to the accompanying drawings.





The  
Patent  
Office  
14

Application No: GB 9807440.4  
Claims searched: All

Examiner: Sue Willcox  
Date of search: 27 August 1998

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.P): H4F (FBB, FHT); H3Q (QCD); H4T (TDAA)

Int CI (Ed.6): H04N (5/445, 7/025, 7/035, 7/083, 7/084, 7/085, 7/088)

Other: Online databases: WPI, Japio, Inspec

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	US 5619274 StarSight Telecast, Inc	
A	US 5296931 Samsung Electronics Co., Ltd	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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